Metals Recovery, Waste Minimization, and Waste Reduction Using the Disassembly Sanitization Operation (DSO) for the Management of Classified Materials/Items at Sandia National Laboratories/New Mexico (FY06)

Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy's National Nuclear Security Administration under Contract DE-AC04-94AL85000.

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Abstract:

DOE is addressing disassembly and disposition of the inventory of retired weapons, their components, spare parts, and maintenance equipment. Treaty agreements and reconfigurations of the DOE Complex brought about the implementation of the Disassembly Sanitization Operation (DSO) process. This process supports weapon disassembly and disposition by using recycling and waste minimization efforts. As a result, overall recycling rates for material sent through the DSO process have enabled 70 to 80 percent of these components to be recycled.

Description:

In the past, large inventories of classified weapon components were required to be kept in long-term storage at SNL/NM and many other locations throughout the DOE Complex. These components have been stored because they are classified, they may also contain radiological and/or hazardous subcomponents, and no disposal options existed. Long-term storage, costly and somewhat problematic, requires a secure storage area, monitoring, and auditing, and also has the potential for loss or theft of this material.

The DSO process was developed and proven successful during the Environmental Restoration (ER) Project cleanup of the Classified Waste Landfill site at SNL/NM. This ER site held legacy classified components that needed to be removed, and the site needed remediation for closure. A detailed Work Control process, as well as the SNL Integrated Safety Management System (ISMS), were utilized during this process.

The DSO capability, developed for this cleanup project, was recognized as having potential for many different applications; e.g., to be transferable to current-day inventories of classified weapon components in long-term storage at SNL/NM and other locations. Although older and outdated classified weapons components have no future use, they have to be stored securely on-site(s) because no disposal path exists for this type of material. By disassembling and sanitizing classified material, the metals could be recycled, the remaining material could be disposed, and the need for storing the inventory of classified weapons components could be eliminated.

Prior to DSO development outside the original application, all regulatory requirements were evaluated and adequately satisfied to confirm that the DSO could be applied to excess classified weapons components.

In 2004, the DSO Program Leader submitted a proposal to management of the Neutron Generator Production Facility (NGPF) to implement the process for classified weapons components stored at the NGPF. The proposal focused on taking these classified materials, and either removing the classified part or pieces, or rendering the classified parts or pieces unclassified.

The disassembly process segregates each material type. The sanitization process prevents these materials from continuing to exist as classified material. Sanitization of these materials uses a number of methods including, but not limited to, shredding, destruction by a ring mill, cutting with band saws and/or basic hands-on disassembly of the components. After the materials have been sanitized, they are no longer required to be stored as classified matter. These components are made to extreme standards of high-quality materials. The demand for these sanitized metals is very high.

In 2005, initial process test runs for the application of the DSO process at the NGPF were successfully completed. Utilizing this process on the classified weapons components parts/pieces allows recovery of the metal for recycling. In the first year of full-scale operation, 2006, the DSO process recycled approximately 7,000 pounds (lb) of metal. Photographs of some processing equipment and recovered metals are attached.

By building recycling into this process, the DSO program avoided substantial waste management and disposal costs, and directed more funding to the DSO mission. Recycling avoided the disposal of hazardous metals in the environment and helps avoid the extraction of the raw material from the earth for the future manufacture of metal products. Approximately 1,500 lb of the recycled metal was lead or lead-contaminated material.

After segregating the metals for recycle, the remaining materials can be managed independently of each other. These additional materials comprise only 20 to 30 percent of the components' materials, and as segregated materials they can then be disposed of rather than stored. Some of the materials become classified low-level waste.

The DSO process for the NGPF classified components established the credibility of this technique as a viable process for addressing the long-term storage requirements of classified weapons component inventory. The success of this operation has generated interest from other Sandia organizations and other locations throughout the complex. Other organizations are soliciting the help of the DSO team, and the DSO is responding to these solicitations by expanding its scope to include work for other projects; Pantex has asked the DSO team to assist with the destruction of their classified components. The operation is full scale and continues to grow and serve SNL/NM and DOE by providing a solution to this evolving issue.

It is estimated that this project will save the DOE and Sandia several hundreds of thousands of dollars until the excess inventory is eliminated. This innovative approach eliminates the need for long-term storage of classified weapons components and the associated accounting.

Metal stored prior to Rad Release and Recycle

Shredder in Containment Structure

Scrap Aluminum from Disassembly Operations

Example of recyclable metal from the DSO